

Rubber World

BILL COMMUNICATIONS, INC.

77 North Miller Rd., Akron, Ohio 44313

Twelve Months' Index

Volumes 163-164

October 1970 to September 1971

GENERAL INDEX

A

- Acquisitions/Mergers N 18, My 20
- See also Business/Financial
- Address Changes Ap 20
- See also Business/Financial
- Adhesive & Sealant Council, Inc. F 34, My 85, S 80
- Adhesives and sealants, see Rubber Products
- Aircraft N 52, 53, Ma 39, My 65
- Akron Rubber Group D 18, Ap 26
- Akron Summit Polymer Conference Ma 32
- Akron University Ma 32, 34, S 25
- AMERICAN CHEMICAL SOCIETY
- Akron Section Ma 32
- Chemical Marketing & Economics Division meets with Rubber Division S 81
- DIVISION OF RUBBER CHEMISTRY
- Best paper selected N 40
- MEETINGS
- Apr. 27-30, 1971, Miami Beach Ma 51
- Abstracts of papers Ma 52
- Fall '71 program and exhibition N 40, My 27, S 81
- Abstracts of papers S 82
- Exhibitors at Show S 108
- Schedule (1971-1978) D 18
- American Society for Quality Control Au 79
- AMERICAN SOCIETY FOR TESTING & MATERIALS
- D-11 letter-balloted on changes My 27
- F-9 Committee on Tires formed My 38
- Lab directory being revised Ja 26
- Papers wanted for international consumer satisfaction symposium, June 73, Phila., Pa. Je 43
- American Transit Assn. Ap 21
- American Trucking Assn. Ap 21
- Asphalt, use of, in paving N 40, Ap 28, 32
- Australia O 24, 36, N 33, 34, D 44, Ma 15, 40, My 32
- Australian Rubber Mfrs. Assn. D 18, My 32, S 80
- Australian Tire Dealers' Assn. My 32
- Austria Au 32
- Automation: Industrial robots Au 67
- Automotive D 21, 63, Ja 25, 28, F 31, Ma 21, 65, Ap 21, 43, My 21, 28, Je 34, 43
- Awards D 77, Ja 59, F 76, Ma 74, Ap 39, My 85, Je 86, Jl 86, Au 77

B

- Belgium N 17, Je 13, Au 15, S 38
- Blue Ridge Rubber Group, Inc. Ma 19
- BONDING
- Degussa betters the bond between textile or steel cord and rubber for retreads or belts Ma 27
- Book Reviews N 103, F 79, Ap 82, My 76, Je 73, Jl 89, Au 89, S 120
- Brazil S 37
- Bulletin Board N 18, D 34, Ma 16
- Business, see Financial/Business
- Butadiene process, high purity, developed O 39

C

- Calendar O 12, N 36, D 12, Ja 12, F 14, Ma 10, Ap 12, My 12, Je 9, Jl 12, Au 12, S 12
- California Mfrs. Assn. D 77
- Canada N 17, 33, D 34, 40, 41, 65, Ja 26-28, 54, F 34, 35, Ma 30, 41, Ap 19, 31, 32, 37, Jl 30, Au 28, S 42

CARBON BLACK

- Canada: shifts in the market place Ja 54
- Computer, image analyzing, for rubber, CB Ap 33
- Interactions of zinc oxide and other curatives in carbon black pigmented NR-BR rubber My 41
- Morphology: new techniques for characterization My 48
- New horizons for the rubber industry—II F 43
- New sub for black (Marathon Oil's coal or coke process) Jl 27
- Pigment black production stopped by Columbian International Ma 33
- CELLULAR EXPANDED RUBBER
- Properties of free-blown cellular expanded rubber Ma 45
- Chemical Clearing House Service Ap 31
- Chemical Institute of Canada Je 43, Jl 85
- Chemical Marketing Research Assn. Jl 33
- China Je 32
- Coatings Ja 69, My 65, 91
- Comecan Countries Ap 39
- Compounding, novel trends in F 56
- Congo, Democratic Republic of the N 32
- Consumer Standards, ASTM symposium Je 43
- Contracts/Awards N 18
- See also Financial/Business

CORDS

- Survey of cord candidates for radial tire belts Jl 41
- COURSES
- Business Aspects of Chemistry (Chem. Mkt. & Econ. Div. ACS) S 81
- Compounding (ARG) D 18
- Instrumentation (Honeywell) S 80
- Polymer Engineering (ACS) S 81
- Polymeric Materials (Brooklyn Poly) S 80
- Polymerization Technology (Rubber Div. ACS) Ma 51
- Tire Technology (Rubber Div. ACS) S 81
- Crumb Rubber, see Natural Rubber
- Czechoslovak Society for Industrial Chemistry, Rubber Division symposium D 18
- Czechoslovakia My 37, Jl 30

D

- Detroit Rubber & Plastics Group D 18, Au 40
- Deutsche Kautschuk-Gesellschaft Ma 18, My 27
- Distributors announced D 34
- See also Financial/Business

E

- Ecology F 23, Je 29, Au 23
- Editor's Column O 10, N 11, D 10, F 10, Ma 8, Ap 8, Jl 4, Au 4, S 5
- Elasticity, Rubber: Symposium on Recent Developments (Hall of Fame) F 61
- Electronics N 52, 53
- Equipment O 29, 101, N 58, 62, 91, D 40, 51, 39, 72, Ja 27, 28, 53, 69, F 43, 78, Ma 30, 40, 45, 85, Ap 33, 36, 50, 68, 89, Je 69, 76, Jl 73, 88, Au 67, 72, 86, S 70, 74, 122
- Europe Ma 33, Ap 63, Jl 36, Au 32
- Expansions Ma 16, My 17
- See also Financial/Business
- Exposition of Chemical Industries Je 25
- Extrusion, Wire insulation foam, novel technique Ja 25

F

- Fabrics Ja 69, Je 81

FIBERS

- Cord, tire: Survey of cord candidates for radial tire belts Jl 41
- Filament-wound tires revisited Ja 53
- Glass Ja 51, 52
- New Horizons for the rubber industry—II F 43
- Nylon for coatings/dispersions, Microcrystalline Au 85
- Polyester F 18
- Rayon Ap 21
- Str-r-etch cord, BFG's — new twist in tire reinforcement F 69
- Survey of cord candidates for radial tire belts Jl 41
- TIRE CORD
- Battle of the inorganics (steel and glass) N 47
- Nylon leads the way; rayon down sharply; polyester also down N 18
- Nylon over polyester F 18
- Polyester, Rayon's comeback blow to Ja 26
- Polyester: Test says "no catastrophic failure" My 21
- Rayon's comeback blow to polyester Ja 26
- Financial/Business Report O 24, N 17, D 33, F 17, Ma 15, Ap 19, My 17, Je 13, Jl 16, Au 15, S 16

FLAMEPROOFING

- Elastomeric coatings and flame retardance My 65
- Flame retardant polyurethanes open new application N 52
- Halogenated hydrocarbons flame retard polyurethane N 53
- Flamethanes—flame retardant additives N 52
- Flow behavior, Measuring, with Brabender Plasti-Corder My 61
- Foreign Technology D 8 (dom)
- Fort Wayne Rubber & Plastics Group, Inc. Ja 20, Je 43
- France N 17, Ma 15, 33, Ap 18, Au 23, 32

G

- German Rubber Society, see Deutsche Kautschuk Gesellschaft
- Germany N 31, F 17, 34, 39, Ma 27, 30, 32, 33, 38, Ap 20, 39, My 32, 37, Jl 16, 36, Au 32, 33, S 32, 37
- Glass, see Fibers
- Great Britain O 24, N 17, 18, 31, 32, 34, 38-41, Ap 19, 20, 33, 37, My 33, 37, D 41, 43, Ja 26, 29, F 18, 34, Ma 33, Je 16, 34, Au 15, 18, 28, S 35, 37

H

- Hall of Fame F 61
- Hungary Au 32

I

- IMPORTS
- New horizons for the rubber industry—II F 43
- India O 34, 36, Ma 39, My 17, Au 19
- Institut Français du Pétrole Ma 39
- INSTITUTION OF THE RUBBER INDUSTRY
- Adhesives Group, Proposed S 79
- Australasian Section D 18, S 80
- Future technology, Conference theme Ja 18
- Foundation Lecture, Bateman gives Au 40
- Golden Jubilee conference and program Jl 49
- Merseyside Section NR/SR symposium Au 40
- Rubberex '72 to open with Rubbercon '72 in Brighton in May Je 43

Rubber World

BILL COMMUNICATIONS, INC.

77 North Miller Rd., Akron, Ohio 44313

Twelve Months' Index

Volumes 163-164

October 1970 to September 1971

GENERAL INDEX

A

- Acquisitions/Mergers N 18, My 20
- See also Business/Financial
- Address Changes Ap 20
- See also Business/Financial
- Adhesive & Sealant Council, Inc. F 34, My 85, S 80
- Adhesives and sealants, see Rubber Products
- Aircraft N 52, 53, Ma 39, My 65
- Akron Rubber Group D 18, Ap 26
- Akron Summit Polymer Conference Ma 32
- Akron University Ma 32, 34, S 25
- AMERICAN CHEMICAL SOCIETY
- Akron Section Ma 32
- Chemical Marketing & Economics Division meets with Rubber Division S 81
- DIVISION OF RUBBER CHEMISTRY
- Best paper selected N 40
- MEETINGS
- Apr. 27-30, 1971, Miami Beach Ma 51
- Abstracts of papers Ma 52
- Fall '71 program and exhibition N 40, My 27, S 81
- Abstracts of papers S 82
- Exhibitors at Show S 108
- Schedule (1971-1978) D 18
- American Society for Quality Control Au 79
- AMERICAN SOCIETY FOR TESTING & MATERIALS
- D-11 letter-balloted on changes My 27
- F-9 Committee on Tires formed My 38
- Lab directory being revised Ja 26
- Papers wanted for international consumer satisfaction symposium, June 73, Phila., Pa. Je 43
- American Transit Assn. Ap 21
- American Trucking Assn. Ap 21
- Asphalt, use of, in paving N 40, Ap 28, 32
- Australia O 24, 36, N 33, 34, D 44, Ma 15, 40, My 32
- Australian Rubber Mfrs. Assn. D 18, My 32, S 80
- Australian Tire Dealers' Assn. My 32
- Austria Au 32
- Automation: Industrial robots Au 67
- Automotive D 21, 63, Ja 25, 28, F 31, Ma 21, 65, Ap 21, 43, My 21, 28, Je 34, 43
- Awards D 77, Ja 59, F 76, Ma 74, Ap 39, My 85, Je 86, Jl 86, Au 77

B

- Belgium N 17, Je 13, Au 15, S 38
- Blue Ridge Rubber Group, Inc. Ma 19
- BONDING
- Degussa betters the bond between textile or steel cord and rubber for retreads or belts Ma 27
- Book Reviews N 103, F 79, Ap 82, My 76, Je 73, Jl 89, Au 89, S 120
- Brazil S 37
- Bulletin Board N 18, D 34, Ma 16
- Business, see Financial/Business
- Butadiene process, high purity, developed O 39

C

- Calendar O 12, N 36, D 12, Ja 12, F 14, Ma 10, Ap 12, My 12, Je 9, Jl 12, Au 12, S 12
- California Mfrs. Assn. D 77
- Canada N 17, 33, D 34, 40, 41, 65, Ja 26-28, 54, F 34, 35, Ma 30, 41, Ap 19, 31, 32, 37, Jl 30, Au 28, S 42

CARBON BLACK

- Canada: shifts in the market place Ja 54
- Computer, image analyzing, for rubber, CB Ap 33
- Interactions of zinc oxide and other curatives in carbon black pigmented NR-BR rubber My 41
- Morphology: new techniques for characterization My 48
- New horizons for the rubber industry—II F 43
- New sub for black (Marathon Oil's coal or coke process) Jl 27
- Pigment black production stopped by Columbian International Ma 33
- CELLULAR EXPANDED RUBBER
- Properties of free-blown cellular expanded rubber Ma 45
- Chemical Clearing House Service Ap 31
- Chemical Institute of Canada Je 43, Jl 85
- Chemical Marketing Research Assn. Jl 33
- China Je 32
- Coatings Ja 69, My 65, 91
- Comecan Countries Ap 39
- Compounding, novel trends in F 56
- Congo, Democratic Republic of the N 32
- Consumer Standards, ASTM symposium Je 43
- Contracts/Awards N 18
- See also Financial/Business

CORDS

- Survey of cord candidates for radial tire belts Jl 41
- COURSES
- Business Aspects of Chemistry (Chem. Mkt. & Econ. Div. ACS) S 81
- Compounding (ARG) D 18
- Instrumentation (Honeywell) S 80
- Polymer Engineering (ACS) S 81
- Polymeric Materials (Brooklyn Poly) S 80
- Polymerization Technology (Rubber Div. ACS) Ma 51
- Tire Technology (Rubber Div. ACS) S 81
- Crumb Rubber, see Natural Rubber
- Czechoslovak Society for Industrial Chemistry, Rubber Division symposium D 18
- Czechoslovakia My 37, Jl 30

D

- Detroit Rubber & Plastics Group D 18, Au 40
- Deutsche Kautschuk-Gesellschaft Ma 18, My 27
- Distributors announced D 34
- See also Financial/Business

E

- Ecology F 23, Je 29, Au 23
- Editor's Column O 10, N 11, D 10, F 10, Ma 8, Ap 8, Jl 4, Au 4, S 5
- Elasticity, Rubber: Symposium on Recent Developments (Hall of Fame) F 61
- Electronics N 52, 53
- Equipment O 29, 101, N 58, 62, 91, D 40, 51, 39, 72, Ja 27, 28, 53, 69, F 43, 78, Ma 30, 40, 45, 85, Ap 33, 36, 50, 68, 89, Je 69, 76, Jl 73, 88, Au 67, 72, 86, S 70, 74, 122
- Europe Ma 33, Ap 63, Jl 36, Au 32
- Expansions Ma 16, My 17
- See also Financial/Business
- Exposition of Chemical Industries Je 25
- Extrusion, Wire insulation foam, novel technique Ja 25

F

- Fabrics Ja 69, Je 81

FIBERS

- Cord, tire: Survey of cord candidates for radial tire belts Jl 41
- Filament-wound tires revisited Ja 53
- Glass Ja 51, 52
- New Horizons for the rubber industry—II F 43
- Nylon for coatings/dispersions, Microcrystalline Au 85
- Polyester F 18
- Rayon Ap 21
- Str-r-etch cord, BFG's — new twist in tire reinforcement F 69
- Survey of cord candidates for radial tire belts Jl 41
- TIRE CORD
- Battle of the inorganics (steel and glass) N 47
- Nylon leads the way; rayon down sharply; polyester also down N 18
- Nylon over polyester F 18
- Polyester, Rayon's comeback blow to Ja 26
- Polyester: Test says "no catastrophic failure" My 21
- Rayon's comeback blow to polyester Ja 26
- Financial/Business Report O 24, N 17, D 33, F 17, Ma 15, Ap 19, My 17, Je 13, Jl 16, Au 15, S 16

FLAMEPROOFING

- Elastomeric coatings and flame retardance My 65
- Flame retardant polyurethanes open new application N 52
- Halogenated hydrocarbons flame retard polyurethane N 53
- Flamethanes—flame retardant additives N 52
- Flow behavior, Measuring, with Brabender Plasti-Corder My 61
- Foreign Technology D 8 (dom)
- Fort Wayne Rubber & Plastics Group, Inc. Ja 20, Je 43
- France N 17, Ma 15, 33, Ap 18, Au 23, 32

G

- German Rubber Society, see Deutsche Kautschuk Gesellschaft
- Germany N 31, F 17, 34, 39, Ma 27, 30, 32, 33, 38, Ap 20, 39, My 32, 37, Jl 16, 36, Au 32, 33, S 32, 37
- Glass, see Fibers
- Great Britain O 24, N 17, 18, 31, 32, 34, 38-41, Ap 19, 20, 33, 37, My 33, 37, D 41, 43, Ja 26, 29, F 18, 34, Ma 33, Je 16, 34, Au 15, 18, 28, S 35, 37

H

- Hall of Fame F 61
- Hungary Au 32

I

- IMPORTS
- New horizons for the rubber industry—II F 43
- India O 34, 36, Ma 39, My 17, Au 19
- Institut Français du Pétrole Ma 39
- INSTITUTION OF THE RUBBER INDUSTRY
- Adhesives Group, Proposed S 79
- Australasian Section D 18, S 80
- Future technology, Conference theme Ja 18
- Foundation Lecture, Bateman gives Au 40
- Golden Jubilee conference and program Jl 49
- Merseyside Section NR/SR symposium Au 40
- Rubberex '72 to open with Rubbercon '72 in Brighton in May Je 43

Instruments	O 103, N 30, 75, 95, D 37, Ja 69, F 35, 43, Ap 94, My 55, 61, 65, 94, JI 89, Au 87, S 124
INTERNATIONAL INSTITUTE OF SYNTHETIC RUBBER PRODUCERS, INC.	
Meeting (1971) in Sydney, Australia	N 40, Je 71
Rubber/asphalt symposium sponsored by above, held in Utah in May	N 40, Ap 28
International Organization for Standardization TC 45 program	Ja 18, S 79
International Rubber Research & Development Board	My 27
International Rubber Science Hall of Fame	F 61
INTERNATIONAL RUBBER STUDY GROUP	
Meeting in Singapore, Oct. 1970	D 18
London, June 1971	Au 41
INTERNATIONAL STANDARDS ORGANIZATION	
D-11, ASTM, letter-balloted	My 27
Ireland, Northern	Je 34
Israel	F 17, JI 36, Au 15, S 16
Italy	D 37, 45, F 31, Ma 21, Ap 19, 32, JI 16, 36, Au 32, 33

Japan	O 29, 36, 37, 39, N 17, 18, 25, 32, 35, D 41-43, 45, Ja 25, 27, F 18, 31, 39, Ma 27, 33, 34, 39-41, Ap 20, 32, 36, 37, My 17, 29, 37, 38, Je 37, JI 30, 69, Au 28, 32
Japan Automobile Tire Mfrs. Assn.	N 35
Japan Rubber Goods Industry Assn.	Je 37
Japan Rubber Mfrs. Assn.	My 38
Jobs & People	O 93, N 83, D 72, Ja 57, F 73, Ma 71, Ap 71, My 81, Je 82, JI 83, Au 75, S 113

Kenya	O 24
Korea	Ja 28

L	
LATEX	
Acrylic latex binder for caulks, sealants, mastics	My 91
For heat-moldable papers	Je 75
No-gel latex for fireproofing	F 83
Protector, The Hand	Ap 89
Rubberized road's popularity growing	Ap 32
LEGAL	
Goodyear wins trademark fight (Neolite)	Ma 39
Letters to the Editor	N 20, D 14, Ma 8, Ap 10, Au 7
LIQUID RUBBER	
BR	Ap 19, Ja 47
Firestone's cast cordless tire	Je 51
Watson (RPRA) discusses	S 35
Literature, Computer search of, offered by Akron U.	Ma 34
Literature, New	O 111, N 103, D 82, J 70, F 79, Ma 80, Ap 82, My 96, Je 73, JI 90, Au 89, S 120
LITHENE LIQUID BUTADIENE POLYMER	
Revertex, Lithium Corp. sign liquid	Ap 19
LITHENE QH POLYMER	
Evaluation of a new low molecular weight BR as an NR curing plasticizer	Ja 48
Louisiana Chemical Assn.	S 80
Luxembourg	Je 34

M	
Malayan Rubber Fund Board	N 31, Je 32
Malaysia	N 31, S 30
Manufacturing Chemists Assn.	Au 79
Marketing, Chemical, in the Rubber Industry	My 27
Materials	N 99, D 69, Ja 67, F 83, Ma 87, Ap 89, My 81, D 18, Ja 18, Ma 10, Ap 26, My 27, Je 43, Au 40, S 79
Meetings	Ap 26, My 27, Je 43, Au 40, S 79
Metals-Retimer	Ap 33
MINING	
Flame retardant polyurethanes open new application areas	N 52
Halogenated hydrocarbons flame retard polyurethanes	N 53
Molecular probe: new analytical tool	N 75
MOON	
Tires and golf balls make first appearance on moon	Ma 33
Tires for Apollo 14 mission	Ja 28
Morocco	Ma 16
Morphology, Carbon black: new techniques for characterization	My 48

N	
Name Changes, Company	My 20
See also Financial/Business	
National Assn. of Chemical Distributors	JI 16, S 80
National Assn. of Motor Bus Owners	Ap 21
National Industrial Pollution Control Council	D 77
NATURAL RUBBER	
Comparative properties of NR and cis-1,4 polyisoprene	JI 51
Consumption down in May	O 24
Crumb rubber: more factories to be built in Malaysia	N 31
Emulsion polybutadiene for tire carcass applications	N 66
Import duty measure, tread rubber refund bill die	F 23
Interaction of zinc oxide and other curatives in carbon black pigmented NR-BR rubber	My 41
International Rubber R&D Board meeting on specifications, in Ceylon	My 27

O	
Outlook bright: Hurley before Phila. Rubber Group	Ja 20
New horizons for the rubber industry	Ja 39, F 43
Plan NR Bureau office in China	Je 32
Plasticizer, Evaluation of a new low molecular weight BR as an NR curing	Ja 48
Rubber in asphalt pavements (International Symposium held in Utah in May)	Ap 28
Sales, GSA	O 21, N 13, Ma 21, JI 27
Standard Rubber Contract urged	My 32
Standardized (expected) (Mullins of NRPR)	My 36
Thermoplastic NR under study	Ap 69
Natural Rubber Producers' Research Assn.	Ap 69, My 36
Natural Rubber Shippers Assn.	S 28
Neolite: Goodyear wins trademark fight	Ma 39
Netherlands	O 39, Ja 28, Ap 63, Je 37
Noise, Truck tire, study underway	N 13
Nylon, see Fibers	

O	
OBITUARIES	
Bridgwater, Ernest R.	D 78
Carlson, Robt. W.	S 116
Carlson, Theodore E.	Au 79
Christensen, Chester W.	My 85
Cole, Edw. A.	N 88
Cranston, Lawrence	My 85
Cummings, John R.	Au 79
Dwyer, Frank L.	JI 86
Freedlander, A. L.	S 116
Graham, T. G.	S 116
Hall, S. S. (Sam)	Ma 75
Johnson, Robt. P.	Ja 61
Kennedy, Jas. E.	Ma 75
Kohlhagen, Fred A.	Je 86
Leistensneider, Geo. P.	My 85
Mason, Herbert Thompson	Ja 61
McQueen, Loren A.	Je 86
Mearns, Francis K.	D 78
Ossefort, Z. T.	Ja 61
Pryor, Henry P.	Ja 61
Sapp, John R.	Je 86
Turner, Russell J.	F 76
Urich, Ralph T.	My 85
Winspear, Geo. G.	O 99
Oxidation, Rubber-Symposium at International Rubber Conference	My 27

P	
Patents	N 30, 33, D 37, 40, 44
Philadelphia Rubber Group	Ja 20
PLASTICS	
ABS	
Polymer bows out	Ma 30
Butyl grafted to polyethylene yields thermoplastic elastomer	O 39
Butyl/PE belting meets FDA requirements for food processing	O 85
Flame retardant PE insulates W&C	JI 26
Polyethylene resin joint venture denied	Ma 21
PVC	
Compound for jacketing, insulation, flameproofing	My 92
Outlook bullish; table of end-use markets	JI 33
RESINS	
Liquid polybutadiene resin suitable as a plasticizer	Je 75
Polybutadiene resin for solvent-free production	JI 87
Polyurethane, for difficult adhesive problems	Au 85
Ready-to-go urethane resin	Je 75
Urethane elastomers: new route to high performance pigmented products	O 53
POEM	
Bushings, mounts computer-tuned	Ap 46
Poland	Ap 32
Polyester tire cord, see Tires	
Price Changes	D 34
See also Financial/Business	
PRICES	
Compounding Ingredients	Ja 75
Silicone rubbers in automotive applications	Ap 43
Tires, see Tires	
Wages up—tire and mechanical prices to be upped again in UK?	Ap 37
PRODUCT EVALUATION	
ASTM international symposium on, for consumer satisfaction, June '73, Phila., Pa.	Je 43
Properties, Free-blown cellular expanded rubber	Ma 45
Publisher's Page	O 4, N 4, D 4, Ja 4, F 4, Ma 4, Ap 4, My 4

Q	
Quebec Rubber & Plastics Group	D 18, Au 40

R	
Raman spectroscopy of rubber	Je 47
Rayon, see Fibers	
Reclaimed rubber, USSR report on	Ap 36
Resins, see Plastics	
RETREADING	
How chopped-glass fibers help one retreader	Ja 52
Mini-glass fibers in off-road treads, See more use of	Ja 51

Tire regulations (DOT): what to expect in '71	D 24
USSR report on	Ap 36
Retreads standards, see Tires	
ROADS	
Rubber/asphalt	N 40, Ap 28, 32
Rubber road surface, tire groove inserts proposed	Ma 39
Rubberized road's popularity growing	Ap 32
Roll covering technique	S 70
Rubber Association of Canada	JI 85
Rubber Applications	Je 81
RUBBER CHEMICALS	
Accelerators for neoprene	My 92
For polychloroprene-TMTU	S 61
Activator and curing agent dispersion	D 70
ADDITIVES, FLAME RETARDANT	
Flame retardant polyurethanes open new application areas	N 52
Halogenated hydrocarbons flame retard polyurethanes	N 53
Antifoam emulsion, Silicone	Ma 87
Anti-static conductive coatings	My 91
Binder, Flame retardant	D 69
Coatings, Abrasion resistant	D 69
COMPOUNDING ADDITIVES	
Patents, Australian	N 33
Crosslinker (NRPR)	S 38
Curing agents for architectural and automotive sealants	F 85
Cyclic processing chemicals put damper on '69 production, sales	Ma 15
Desiccant mechanical part	D 69
Fatty acid, New	Ap 89
Fillers, Non-black	Au 45
FLAME RETARDANTS	
For polymers	Ap 91
XLPE compounds for W&C insulation	JI 87
Formula, Mold making	Ja 68
Fungicide, Low toxicity industrial	Ap 89
Granular	Au 85
Halides, organic	N 99
Interaction of zinc oxide and other curatives in carbon black pigmented NR-BR rubber	My 41
Intermediate for (THBA)	My 92
LUBRICANTS	
Mold releases, Paintable	Ma 87
TFE	D 69
Magnesia dispersion for polychloroprene	Je 75
MgO, More seawater	Ap 89
Modifier, MNNA	My 37, JI 51
Molecular sieves fight water	JI 67
New horizons for the rubber industry—II	F 43
Novel trends in compounding	F 56
Peptide synthesis, Aids in	N 99
Plasticizer/solvent, High boiling aromatic	Je 75
PLASTICIZERS	
BR as an NR curing plasticizer, Evaluation of a new low molecular weight (Lithene QH Polymer)	Ja 48
Liquid polybutadiene resin suitable as a Polymeric, with brittle point below -20°C.	JI 87
Polyesters for polyurethane uses	JI 87
Prices	Ja 75
Processing aid: NBR	Ja 68
Reinforcer New sub for black-Marathon	JI 27
Oil's coal or coke process	JI 27
RELEASE AGENTS	
For tread tray trucks	D 69
Internal	D 69
Replacement chlorinated biphenyls	Ap 91
Research chemicals, New	F 85
Silanes in elastomers: new route to high performance pigmented products	O 53
Silica, colloidal, for rubber	D 69
Silicone rubbers in automotive applications	Ap 43
Silicones: For wet, dry, or lubricated powders	JI 87
Silyl peroxides: adhesion promoters and crosslinkers	Je 56
Stripping compound	D 70
Surfactants: Liquid silicones	Ja 68
Tackifier for adhesives	Au 85
Thickener, Easier processing latex	Ja 68
Rubber dust for mats for cows	S 30
RUBBER INDUSTRY	
Adhesives growth predicted in durable goods industries	N 30
Canadian, Expectations for '71 mixed	F 35
Canadian rubber products: fending off the imports	D 65
Earnings still below 1969 levels	N 13
Equipment, surplus, How to turn into an asset	D 5
Job picture in the industry	F 71
New horizons for the	Ja 39, F 43
RMA's Ormsby sees brighter '71	D 41
Rubber & plastics products—value of shipments (1967-70)	Ja 4
RUBBER MANUFACTURERS ASSN., INC.	
Akron U. Institute, RMA give major push to polymer minor	S 25
Natural Rubber Shippers Assn.	S 28
New horizons for the rubber industry—II	F 43
Ormsby sees brighter '71—annual meeting	D 41
Rubber Products	O 34, 39, 85, 106, N 25, 30, 35, 40, 98, D 55, 63, 69, Ja 25, 28, 29, 39, 67, F 33, 43, 83, Ma 33, 39, 40, 65, 86, Ap 19, 31, 36, 43, 83, 89, 93, My 21, 29, 93, Je 13, 34, 37, 79, JI 30, 63, 89, Au 86, S 30, 122, 128

RUBBER TRADE ASSN.

Standard Rubber Contract urged	My 32
Rubbercon '72	Je 43
Rubberex '72	Je 43
Rumania	Jl 36, S 35

S

SAFETY

Automotive	D 21, Ja 25, Ma 21, Ap 21, My 21, Je 34, Jl 26
Economics of regulated safety	Ma 65, Ap 55
Elastomeric coatings aid flame retardance	My 65
Fireproofing, No-gel latex for	F 83
Flame retardant PE insulates W&C	Jl 26
Occupational Safety & Health Act	F 23
Tires, see Tires	
Workshop	S 80
Salesmen's Assn. of the American Chemical Industry, Inc.	My 85
Society of Aerospace Materials & Process Engineers	Ap 28
Society of Plastics Engineers	My 85
Sounding Off, See Publisher's Page	
SOUP, INC.	N 13, D 21, Ap 21
South Africa	N 17
Spain	Au 19, 33
Specifications: International Rubber R&D Board meeting in Ceylon	My 27

STANDARDS

D-11, ASTM, letter-balloted on ISO recommendations	My 27
ISO, see also	
Standardized NR expected	My 36

STATISTICS

Canadian rubber products; fending off the imports	D 65
Japan's CR exports grow	F 18
Demand for SR, 1971	Au 32
New horizons for the rubber industry	Ja 39, F 44
Polyester takes first place, but nylon is tire choice	F 18
Rubber & plastics products—value of shipments (1967-70)	Ja 4

STEEL, see Fibers

SYMPOSIUM

ASTM international symposium on product evaluation for consumer satisfaction	Je 43
Chemical Marketing in the Rubber Industry (Rubber Div, ACS)	S 81
Composite materials (Akron Summit Polymer Conference)	Ma 32
Compounding of EP elastomers (Rubber Div, ACS)	Ma 51
International Conference program	My 27
Mechanical behavior of materials (conference in Kyoto)	Ma 19
Oxidation of Rubber (Rubber Div, ACS)	S 81
Pavements, Rubber-in-asphalt	N 40, Ap 28
Rubber (Czech. Soc. Ind. Chem.)	D 18
Rubber elasticity—Some recent developments (Rubber Hall of Fame ceremonies)	F 61
Rubber dynamics for transportation (Rubber Div, ACS)	S 81
Tire testing (ARG)	Ap 26
Traction and treadwear (Rubber Div, ACS)	Ma 51
Ultrasonic	N 40
Wire and cable	N 40
Synthetic Organic Chemical Mfrs. Assn.	F 23

SYNTHETIC RUBBERS

Black masterbatch at better price	Au 85
BR	
Interaction of zinc oxide and other curatives in carbon black pigmented NR-BR rubber	My 41
Liquid: a booming technology	Ja 47
Plasticizer, Evaluation of a new molecular weight BR as an NR curing	Ja 48

BUTYL

Grafted to polyethylene yields thermoplastic elastomer	O 59
PE belting meets FDA requirements for food processing	O 85
Chloroprene rubber: Japan's exports grow	F 18
Consumption down in May	O 24
Deutsche Kautschuk-Gesellschaft meeting on	My 27
Elastomeric coatings aid flame retardance	My 65
Emulsion, Water-resistant adhesive	Ma 87

EPDM

New high green strength EPDM	Je 76
Tested in German tires	F 34
Two new rubbers	Je 76
W. Europe: booming EPDM market	Ap 63
Epoxy rubber: Tohto Kasei and Hitachi Chemical processes for	Ma 34
FLUOROELASTOMERS	
Improved	My 91
Seals, O-rings	My 91
Kanagafuchi Chemical Industry Co. claims developing new SR	F 39
Molecular rubber, Cold curing	Au 85
NBR: Powdered non-crosslinked developed by Goodrich Chem.	D 42
Neoprene: European capacity grows	Ma 33
New horizons for the rubber industry	Ja 39, F 43

NITRILES

Heat resistance, with more	My 91
Krynac all-purpose	Jl 87
New "ball game" for	Je 76

Oil-resistant SR equal to NR in mechanical properties, Bridgestone's	Ap 32
Polybutadiene, Emulsion, for tire carcass applications	N 66

POLYISOPRENES

Comparative properties of NR and cis-1,4 polyisoprene	Jl 51
Isoprene technology, New	F 31
Polystyrene: EPDM-modified impact	Jl 69
Rubber in paving	N 40, Ap 28, 32
Silanes in elastomers: new route to high performance pigmented products	O 53

SILICONES

Antifoam emulsion	Ma 87
Automotive applications	F 31, Ap 43
Compound, New	Je 76
Liquid to gel, from	My 92
Midsil offers three new	Ja 25
Pellet-form silicone rubber compounds for W&C	Ap 89
Sealant/adhesive	Ap 89
Versatile	F 85
Soviet, German SR figures	Ap 39

URETHANES

Bushings and bearings, market for	D 41
Elastomer technology by NASA	Je 75
Flame retardant polyurethanes open new application areas	N 52
Foam, Versatile	Ma 87
Halogenated hydrocarbon flame retard polyurethanes	N 53
Market	Au 59
Pirelli patents new technique (Evelskin)	Ap 32
Polyester-urethane solution polymers	F 83
Polyether-polyurethane elastomers for cables	Je 76
Thermoplastic	Au 61

T

Taiwan

TARIFFS

Australia cuts protection on rubber	
soling and footwear	O 24
Canadian tariff reform gives tire makers "family" troubles	Ap 19
TechnoMart	O 101, N 91, D 69, Ja 67, F 83, Ma 85, Ap 89, My 91, Je 75, Jl 87, Au 85, S 122

TESTS

Automotive: Skirt and the vacuum cleaner, The	D 63
Economics of regulated safety, The—II	Ap 55
Elastomeric coatings aid flame retardance	My 65
Federal rubber test plan grows	Ma 21
Infrared techniques in non-destructive tire testing	Ap 50
Tires, see	
Textile Workers Union of America	Ap 21
Tire Industry Safety Council	O 21

TIRES

Aircraft	N 29, Ap 39
All-terrain vehicle	D 70, Ap 37
Bicycle	Jl 30
Bus	N 29
Carcasses: Emulsion polybutadiene for tire carcass applications	N 66
Cast cordless, Firestone's	Je 51
Cord, see Fibers	
DOT regulations: what to expect in '71	D 24
Drag	Ja 29
Dual chamber, patents by Goodrich	N 30
EPDM tested in German tires	F 34
Equipment, see Equipment	
F-9 on Tires committee formed by ASTM	My 38
Filament-wound	Ja 53
"Go-anywhere" vehicles	Ap 93
Holographic process to check inflated tire structural irregularities	O 24
Industrial, Non-marking	N 99
Moon	Ja 28
New horizons for the rubber industry—II	F 43
Noise	N 13
Passenger, polyester/fiber glass	D 70
Performance, New devices aid	Ja 28
Polyester: Tests say "no catastrophic failure"	My 21
Prices	My 40, Jl 16
Radial	D 42, Jl 41, Au 23
Regrooved	Ap 21
Retreads	O 21, F 23, Ap 36
Rickshaw	Ma 33
Safety	D 21, 24, Ja 21, 28, F 23, Ma 65, Ap 21, 50, 55, My 21, 32
See also Tire Industry Safety Council	
Sales in '70 pegged at \$5.25 billion	O 34
Scrap barrier safety plan	Jl 26
Specialty	D 72
Steel	Je 25
Summer-to-winter, instant	My 93
Technology symposium	My 27
Testing	D 45, Ap 26, Jl 27, Au 72, 87, S 42
Tire groove inserts proposed	Ma 39
Treads	Ja 51, 62, F 23, 35
Truck	Ma 30, Ap 93
Winter	My 93
Worn, Reusing material from	Je 29
Transportation, Rubber dynamics for (symposium)	My 27
Treads, see Tires	
Twin Cities Rubber Group	Au 40
Tyres: Test says "no catastrophic failure" (polyester tires)	My 21

U

Ultrasonic Mfrs. Assn.	N 40
UNCTAD hears Lamberson on more uses for rubber	Au 41
United Kingdom	N 34
United Rubber Workers of America	N 13

UNITED STATES

Apollo 14: Tires and golf balls on moon	Ma 33
Coast Guard and collapsible containers	S 32
Congress: Tread rubber refund bill, NR import duty measure die	F 23
Consumer class legislation prospects dim	N 13
Dept. of Commerce: NTIS formed	Ja 28
Dept. of Labor: Job safety act	F 23
Dept. of Transportation	N 35, D 21, 24, Ja 21, Ap 21, My 21, Je 34
National Highway Safety Bureau	O 21, N 13, D 21, 24, Ja 21, F 23, Ma 21, 40, Ap 71, My 21

Economics of regulated safety, The	Ma 65, Ap 55
Economy: New horizons for the rubber industry	Ja 39, F 43
Environmental Protection Agency	F 23
Federal Trade Commission	O 21, N 13, D 21, 24, 37, Ja 21, Ma 21, Ap 21
General Services Administration	O 21, N 13, D 24, Ja 21, Ma 21, Jl 27, S 37
Hose, belting expected to get own Standard Industrial Classification	My 21
Infrared techniques in non-destructive tire testing (USA T-AC, NBS, W-P AFB)	Ap 50
NASA	My 65, Je 75
National Bureau of Standards	F 35, Ma 21, 39, S 42
National Labor Relations Board	N 13
Tariff Commission	Ap 21
Wright-Patterson AFB	F 35, Ap 50
U. S. & World Rubber News	O 29, N 25, D 37, Ja 25, F 31, Ma 27, Ap 31, My 29, Ja 25, Jl 26, Au 23, S 25

United States Chamber of Commerce	D 77
USSR	O 39, N 17, Ap 20, 36, 37, 39, Je 36, Au 28
University of Toronto: Molecular probe: new analytical tool	N 75
University of Utah cosponsors rubber/asphalt symposium	Ap 28
Urethanes, see Synthetic Rubbers	
Utah, State of, cosponsors rubber/asphalt symposium	Ap 28

V

VULCANIZATION	
Microwaves cure sponge tubing	Jl 76
Raman spectroscopy of rubber	Je 47

W

Washington Desk	O 21, N 13, D 21, Ja 21, F 23, Ma 21, Ap 21, My 21
White House Conference on Children & Youth, Business-Industry Council	D 77
Winding: Filament-wound tires revisited	Ja 53

ARTICLES

A	
AMP's modified Orbitread unit	S 73
B	
BFG's electronic tire engineer	D 51
Str-r-rech cord—new twist in tire reinforcement	F 69
Britain's IRI 50 years young	Jl 48
Butyl grafted to polyethylene yields thermoplastic elastomer	O 59
Butyl-PE belting meets FDA requirements for food processing	O 85
C	
Canadian rubber products: fending off the imports	D 65
Carbon black in Canada: shifts in the market place	Ja 54
Carbon black morphology: new techniques for characterization	My 48
Centralized computer system tightens inventory control	Jl 73
Comparative properties of NR and cis 1,4 polyisoprene	Jl 51
Continuous extruder with twin rams	S 74
E	
Economics of regulated safety, The	Ma 65, Ap 55
Elastomeric coatings aid flame retardance	My 65
Emulsion polybutadiene for tire carcass applications	N 66
EPDM-modified impact polystyrene	Jl 69
Evaluation of a new low molecular weight BR as an NR curing plasticizer	Ja 48
F	
Filament-wound tires revisited	Ja 53
Firestone's cast cordless tire	Je 51
Flame retardant polyurethanes open new application areas	N 52
G	
Growing role of non-black fillers, The	Au 45

H		
Hall of Fame honors two for rubber-like elasticity work	F 61	
Halogenated hydrocarbons flame retard polyurethanes	N 53	
Hose maker "goes modern" with data collection system	My 55	
How adhesives hold us together	D 55	
Chopped-glass fibers help one retroader	Ja 52	
To turn surplus equipment into an asset	D 59	
I		
Industrial robots reach into rubber	Au 67	
Infrared techniques in non-destructive tire testing	Ap 50	
Interaction of zinc oxide and other curatives in carbon black pigmented NR-BR rubber	My 41	
J		
Job picture in the industry, The	F 71	
L		
Liquid BRs: A booming technology	Ja 47	
M		
Measuring elastomer flow behavior	My 61	
"Merry-go-round" tire tester	N 62	
Microwaves cure sponge tubing	Ja 76	
Mini-computers control processes	My 47	
Molecular probe: new analytical tool	N 75	
N		
Neuro in Rubber, The: A book review	My 76	
NEW		
Dynamic cord fatigue tester	Au 72	
Horizons for the rubber industry	Ja 39, F 43	
Injection molding machine for rubber	Je 69	
Technology bids to revolutionize roll covering	S 70	
Testing device for vulcanizates, A	Ap 68	
Non-black reinforcers and fillers for rubber	Au 46	
Novel trends in compounding	F 56	
P		
Pathex Extruder-Applicator, The	S 72	
Properties of free-blown cellular expanded rubber	Ma 45	
R		
Railroads and rubber: a natural combination	Ja 63	
Raman spectroscopy of rubber	Je 47	
S		
See more use of mini-glass fibers in off-road treads	Ja 51	
Silanes in elastomers: new route to high performance pigmented products	O 53	
Silicone rubbers in automotive applications	Ap 43	
Silyl peroxides: adhesion promoters and crosslinkers	Je 56	
Single-stage machines build radial passenger, truck tires	F 69	
Skirt and the "vacuum cleaner," The	D 63	
Survey of cord candidates for radial tire belts	Ja 41	
T		
Thermoplastic NR under study	Ap 69	
Urethane elastomers	Au 61	
Tire cord: the battle of the inorganics	N 47	
TMTU: significant advance in the curing of polychloroprene	S 61	
U		
Uninterruptible power system prevents computer downtime	N 59	
Urethane elastomers market in profile, The	Au 59	
W		
W. Europe: booming EPDM market	Ap 63	

AUTHOR INDEX

A		
ALLIGER, GLEN	Firestone's cast cordless tire	Je 51
B		
BURGESS, K. A.	Carbon black morphology: new techniques for characterization	My 48
C		
COLEMAN, M.	Raman spectroscopy of rubber	Je 47
CRITCHFIELD, F. E.	Thermoplastic urethane elastomers	Au 61
D		
DE Vlieghe, J. C.	W. Europe: booming EPDM market	Ap 63
DEL GATTO, JOS. V.	Flame retardant polyurethanes open new application areas	N 52

Growing role of non-black fillers, The	Au 45
Industry leaders speak out (Edit.)	Ja 4
Liquid BR's: A booming technology	Ja 47
Mini-computers control processes	My 47
New technology bids to revolutionize roll covering	S 70
Silicone rubbers in automotive applications	Ap 43
Skirt and the "vacuum cleaner," The	D 63
Tire cord: the battle of the inorganics	N 47
DIXON, HENRY L.	
How adhesives hold us together	D 55
DRAVES, CARL Z., JR.	
Survey of cord candidates for radial tire belts	Ja 41
DUNLEAVY, R. A.	
Thermoplastic urethane elastomers	Au 61
E	
EDDY, C. L.	
Butyl grafted to polyethylene yields thermoplastic elastomer	O 59
EDMUNDS, W. M.	
New dynamic cord fatigue tester	Au 72
F	
FAN, Y. L.	
Silyl peroxides: adhesion promoters and crosslinkers	Je 56
FERGUSON, W. L.	
Supplier salesman selling his wares	Ma 4
FLOBERG, JOHN F.	
Economics of regulated safety, The	Ma 65, Ap 53
FLYNN, ELMER E.	
Centralized computer system tightens inventory control	Ja 73
G	
GESCHWIND, D. H.	
TMTU: significant advance in the curing of polychloroprene	S 61
GHANEM, N. A.	
New testing device for vulcanizates, A	Ap 68
GOODMAN, SIDNEY H.	
Measuring elastomer flow behavior	My 61
GRUBER, W. F.	
TMTU: significant advance in the curing of polychloroprene	S 61
H	
HALL, W. E.	
Interaction of zinc oxide and other curatives in carbon black pigmented NR-BR rubber	My 41
HAMED, P.	
Comparative properties of NR and cis 1,4 polyisoprene	Ja 51
HARTMAN, P. F.	
Butyl grafted to polyethylene yields thermoplastic elastomer	O 59
HEADLEY, J. E.	
Sounding off on purchasing now and five years ago	Ap 4
HESS, W. M.	
Carbon black morphology: new techniques for characterization	My 48
HOLMES, ROBT. L.	
Elastomeric coatings aid flame retardance	My 65
HOOGENSEN, DARWIN	
Halogenated hydrocarbons flame retard polyurethanes	N 53
J	
JENNETT, JAS.	
New injection molding machine for rubber	Je 69
JENNINGS, F. CHAS.	
Britain's IRI 50 years young	Ja 48
JONES, H. C.	
Interaction of zinc oxides and other curatives in carbon black pigmented NR-BR rubber	My 41
K	
KHALIFA, W. D.	
New testing device for vulcanizates, A	Ap 68
KOENIG, J. L.	
Raman spectroscopy of rubber	Je 47
KOLESKE, J. V.	
Thermoplastic urethane elastomers	Au 61
KOO, G. P.	
Butyl grafted to polyethylene yields thermoplastic elastomer	O 59
KRACKELER, JOS. J.	
Halogenated hydrocarbons flame retard polyurethanes	N 53
L	
LA ROSE, B. A.	
Properties of free-blown cellular expanded rubber	Ma 45
LANGE, M. D.	
Supplier salesman selling his wares	Ma 4
LAVERY, CHAS. A.	
Editor's Column (General Index)	
LAW, CHAS.	
Molecular probe: new analytical tool	N 75
LEE, ZION S.	
Survey of cord candidates for radial tire belts	Ja 41

LINDBOM, T.	Industrial robots reach into rubber	Au 67
LOCKWOOD, P. A.	New dynamic cord fatigue tester	Au 72
M		
MARSHALL, STUART	Thermoplastic NR under study	Ap 69
McELROY, WM. D.	Crisis for science in serving society (Guest editorial)	N 11
McLEOD, C. W.	Pathex Extruder-Applicator, The	S 72
MILLER, R. L.	See Sounding Off (General Index)	
MORGAN, R. J.	Sounding off on purchasing now and five years ago	Ap 4
MUNSON, G.	Industrial robots reach into rubber	Au 67
MURRAY, T. H.	AMP's modified Orbitread unit	S 73
MURLAND, WM. O.	BFG's electronic tire engineer	D 51
	Str-r-etch cord—new twist in reinforcement	F 69
	Filament-wound tires revisited	Ja 53
	Laboratory safety (editorial)	S 5
	Microwaves cure sponge tubing	Ja 76
	Rubber industry zeroes in on health, safety (editorial)	Au 4
MYERS, I. C., JR.	How to turn surplus equipment into an asset	D 59
P		
PAGANO, C. A.	Silanes in elastomers: new route to high performance pigmented products	O 53
R		
RANNEY, M. W.	Silanes in elastomers: new route to high performance pigmented products	O 53
S		
SAMPLES, BOB	Sounding Off—pound volume cost savings in rubber compounding	My 4
SCOTT, C. E.	Carbon black morphology: new tech- niques for characterization	My 48
SHAW, R. G.	Silyl peroxides adhesion promoters and crosslinkers	Je 56
SHELTON, J. R.	Raman spectroscopy of rubber	Je 47
SHERRICK, J. W.	Railroads and rubber: a natural combination	Ja 63
SKOLNIK, LEONARD	Survey of cord candidates for radial tire belts	Ja 41
SMEAD, J. E.	Do technical salesmen really sell?	Ma 4
SMITH, F. M.	Firestone's cast cordless tire	Je 51
SMITH, W. A.	Firestone's cast cordless tire	Je 51
STARMER, P. H.	Raman spectroscopy of rubber	Je 47
STRECKLER, L. A.	Properties of free-blown cellular expanded rubber	Ma 45
SWEENEY, TOM	Novel trends in compounding	F 56
T		
TOBIN, RICHARD L.	Postal rates and periodicals	F 10
V		
VILL, C. A., JR.	Urethane elastomers market in profile, The	Au 59
VOGEL, PAUL E. J.	Infrared techniques in non-destructive tire testing	Ap 50
W		
WAGNER, M. P.	Non-black reinforcers and fillers for rubber	Au 46
WALKER, L. A.	Comparative properties of NR and cis 1,4 polyisoprene	Ja 51
WELLS, V. W.	Properties of free-blown cellular expanded rubber	Ma 45
WERNER, ALFRED F.	Emulsion polybutadiene for tire carcass applications	N 66
Y		
YEHIA, A. A.	New testing device for vulcanization, A	Ap 68
Z		
ZIEMIANSKI, L. P.	Silanes in elastomers: new route to high performance pigmented products	O 53